PowerPlot™ Software User's Guide

BMI
The Power of Quality

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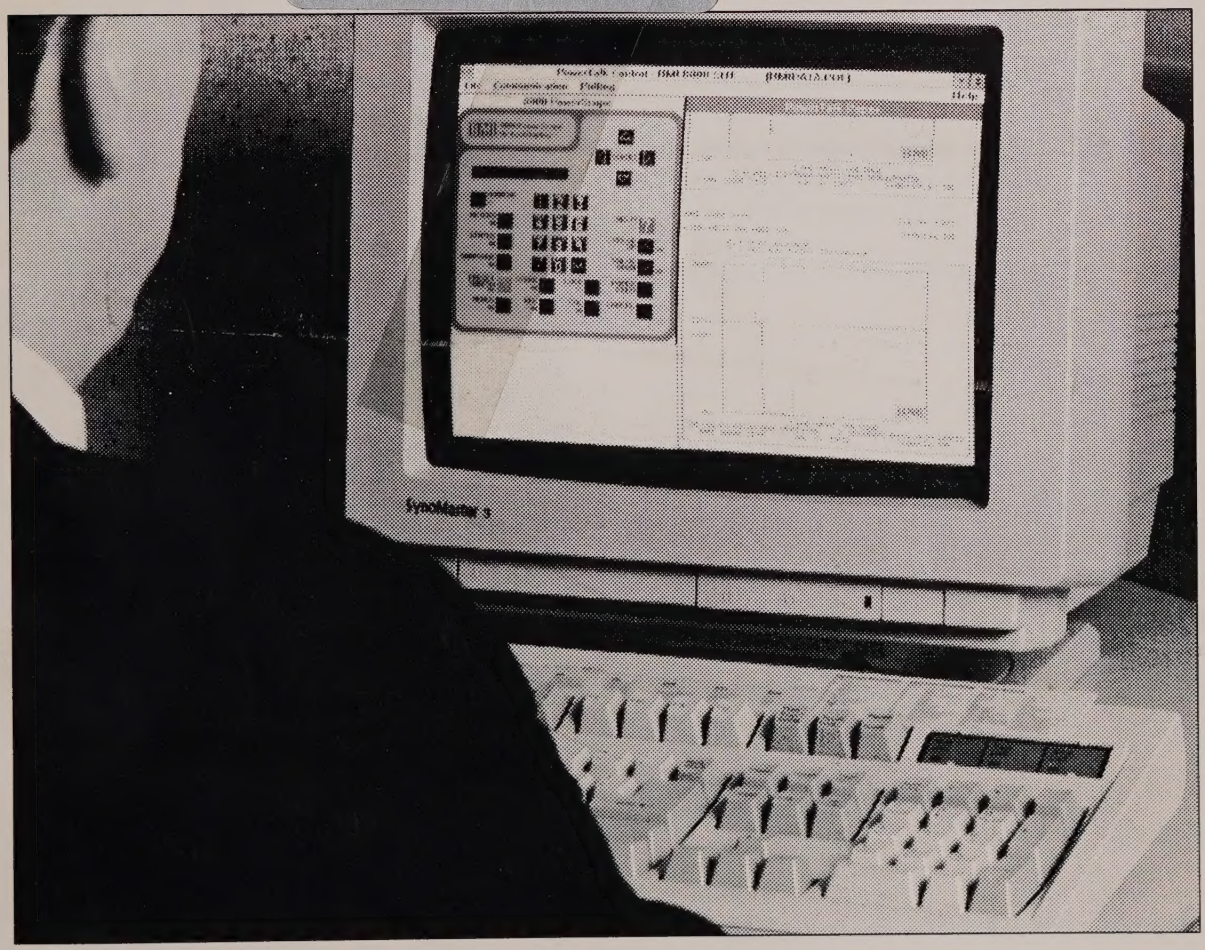

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1 Getting Started

About PowerPlot

PowerPlot is shipped with every Powerscope and PowerProfiler equipped with an optional built-in disk drive. BMI's PowerPlot software consists of PowerPlot View, PowerPlot Control, and PowerPlot Export.

With PowerPlot View, you can use your PC to look at data stored on diskette. You can use PowerPlot View to copy individual graphs or an entire file, cut and paste, and convert graphs to TIFF graphics files for embedding into several types of word processing programs. PowerPlot Control enables you to control an entire network of BMI PowerScopes and PowerProfilers right from your desk. Front panel simulation of the instrument allows you to use the mouse to "push" buttons just as you would sitting in front of the instrument. Furthermore, with any PowerProfiler equipped with revision 4.0 firmware (and higher) you can use the PowerPlot Export software. PowerPlot Export enables you to see what types of graphs exist in a file, and lets you convert summary information into ASCII format and save it in a user-defined file.

PowerPlot Software and Hardware Requirements

PowerPlot is designed for use with Microsoft Windows 3.0 and 3.1. Operation on any other version of Microsoft Windows is not guaranteed, or supported. Please consult your Microsoft Windows manual for proper installation instructions. The hardware requirements are:

- DOS compatible 386 or 486 Personal Computer
- 2 MByte RAM minimum; 4 MByte recommended
- 20 MByte minimum hard drive
- Mouse
- VGA graphics monitor (color or monochrome)

Installing PowerPlot

Note: If you are upgrading from PowerTalk 4.0, only three files from the installation diskette are needed to upgrade to 4.01. This upgrade is most easily done by exiting Windows and copying the files by using the DOS copy command Insert the new PowerPlot diskette in the appropriate floppy drive and copy these three files to your BMI40 directory (or wherever you installed PowerTalk 4.0): bmivcd.386, bmicntrl.exe, and bmicomm.dll. Restart Windows and then run PowerTalk. Now when you check the version number, (look in PowerTalk Control, Help menu, About Control screen), you should see Version 4.01 displayed.

Insert the PowerPlot master disk into your floppy disk drive. When the system prompt appears, you need to select the drive containing the master disk. For example, if the system drive is

Note: PowerPlot will tell you to exit Windows and then restart Windows before running PowerPlot for the first time.

drive C, and the master disk is in drive A, you would type "A:" after the system prompt and then press Return. The system prompt will now show "A:>". If you are using Windows 3.1, you type "win install" and press Return; if you are using Windows 3.0, you type "win/s install" and press Return. This will start your Microsoft Windows application and install PowerPlot.

Setting Communications

The computer will respond with a default directory where you would like the files to be stored. Either select this directory by clicking on "OK" or type in a new directory name and click on "OK". The Communication Settings dialog box will now appear on screen. Use the mouse to select the proper communications settings. Depending on the communication method you are using, you need to use the mouse to select the RS-232 baud rate, the modem baud rate, the serial communication port, the default connection method (RS-232 or modem), and the dial mode. Use the mouse to click on "OK" when the settings are correct. If you need to change communications settings once PowerTalk is installed you can do so through the PowerPlot Control software Communications Menu. When installation is complete, you'll see the PowerPlot window in the Program Manager window (if you load only PowerPlot View, the PowerPlot icon will not be displayed).

Important Notes About Equipment Configuration

Successful operation of PowerPlot depends on proper installation and hardware configuration. Although the Windows-based installation procedure ensures that the proper files are copied to the proper directories on a hard disk, the software has absolutely no control over whether the target system hardware is configured properly. There are several hardware configurations and types which may cause problems when trying to communicate from a personal computer to a BMI instrument.

Correct instrument setup is imperative for successful communications. Any BMI instrument, in order to communicate remotely, must be configured as a "slave". The selected baud rate

must match that of the remote device, and the selected port must match the expected mode of communication, such as RS-232, internal modem, or external modem.

If a particular modem mode is selected, that modem must exist in the system. With an external modem selected, a Hayes compatible modem must be attached to the instrument's RS-232 port. An internal modem requires that the instrument include the modem option and have an internal modem installed. A standard RJ-11 telephone connection must be made between the modem and the telephone line.

With RS-232 as the selected instrument communication mode, an RS-232 cable must be connected between the instrument and the remote device. As a minimum, this cable must provide connections between pins two, three, and seven for DB-25 and pins two, three, and five for DB-9. Also, the connections between pins two and three should be swapped at one end of the cable. This enables the transmit line of each device to be connected to the receive line of the other device.

A personal computer running PowerPlot is more than likely configured to run other applications as well. Some PC hardware and software configurations may cause PowerPlot to fail in its efforts to communicate with an instrument. This is especially true of the serial (COM) ports. There must be no conflict between hardware devices. No two serial devices should be configured as the same communications port. For example, a serial mouse configured for COM1, and an open serial port configured as COM 1 is a hardware conflict. An internal modem may also be configured as a duplicate COM port—this is also a conflict. Be sure that no two serial devices are configured as duplicate COM ports.

Some Hayes compatible modems may be configured as "MNP5", and may power up as such. If this is the case, the extended result codes returned by that modem may cause PowerPlot to fail. Extended result codes and compressed data transmission should be disabled for MNP5 modems. Do this by using the modem patch strings in the PowerTalk Control settings dialog box. Strings entered in the modem patch string fields are sent to a modem without any parsing or syntax checking. Any string can be sent to a modem using the patch strings. Refer to your modem manual for specific modem commands. Remember, the patch strings should be preceded by an "AT" to follow the Hayes command mode format.

PowerPlot Control, when trying to initialize or establish a communications link, will generally return one of two common error messages: "Hardware not available" and "No response from instrument". The first message is typically an indication that an existing drive has attached a mouse or some other device to the chosen serial port, or that the port simply does not exist. The second message may be related to any of the above topics. A good example would be a modem and a COM port both assigned the same IRQ vector address and serial port.

The Windows file SYSTEM.INI (found in the Windows directory) contains a list of device drivers loaded when Windows runs in 386 enhanced mode. The order of this driver list may affect PowerPlot operation. The device statement specifying BMIVCD.386 as a communications driver should be moved ahead of any other VCD.386 device statements. This will ensure that PowerPlot will use the BMI virtual communications driver, should any conflicts arise.

PowerPlot Reference

Both PowerPlot View and PowerPlot Control software have a built-in user's guide. Simply double-click on the PowerPlot Reference icon for a list of topics.

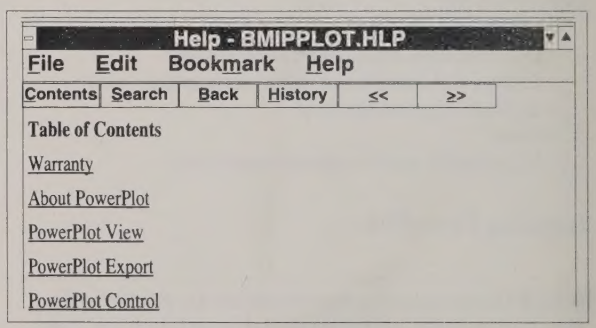

Figure 1: PowerPlot Reference

What To Do If You Don't Want To Use a Mouse

Sometimes it is more convenient to use the computer keyboard rather than a mouse. In this case, you want to use accelerator keys. For instance, to get a harmonics report from an 8800

1 Getting Started

PowerScope you could use your mouse and click on the Snapshot button and then immediately click on the Scroll Up Arrow key. Or if you prefer, you could use your computer keyboard and type "d" followed by the up arrow key. A harmonics report would then be initiated.

Accelerator Keys

The Accelerator keys are provided to allow you to use the computer keyboard instead of the mouse for certain program functions if you find it more convenient.

PowerPlot View Accelerator Keys

File ..... Alt F or Alt f
- Open ..... o
- Close c
- Print File ..... f
- Print Selection ..... s
- Change Printer ..... scroll arrows
- Exit x

Once in the sub-menu, use tabs to scroll through choices. Press Return to enter your choice.

Edit ..... Alt E or Alt e
- Copy c
- Copy to TIFF ..... t
- Search ..... s

File control while in Edit menu

Scroll up ..... up arrow
Scroll down ..... down arrow
Bottom of file ..... end
Top of file ..... home
Move up one report ..... page up
Move down one report ..... page down

Note: There are no accelerator keys to highlight text or graphs. A mouse is required for this capability.

Filters ..... Alt L or Alt l
- 4800 Reports 4
- 3030 Reports 3
- 3030 Snapshots ..... s
- 3030 Miscellaneous ..... scroll arrows

Once in the sub-menu, use tabs to scroll through choices, and space bar to select choices. Press Return to enter your choice.

Help ..... Alt H or Alt h

PowerPlot Control Accelerator Keys

File ..... Alt F or Alt f
- Phone Directory ..... p
- Exit x

Communications ..... Alt C or Alt c
- Connect c
- Disconnect ..... d
- Settings ..... s
- RS-232 ..... r
- Modem ..... m

Once in the sub-menu, use tabs to scroll through choices, and scroll arrows to select choices. Press Return to enter your choice.

Polling ..... Alt P or Alt p
- Harmonics Enter ..... h
- Harmonics Exit ..... e
- Snapshot Enter ..... s
- Snapshot Exit x

Once in the sub-menu, use tabs to scroll through choices, and space bar to select/erase choices. Press Return to enter your choice.

Help ..... Alt H or Alt h

PowerPlot Control Accelerator Keys for 24X0 and 4800 PowerScopes Front Panel Operation

0-9 ..... 0-9 (numeric keypad)
Calibrate c
Cancel printer ..... p
Clear ..... delete
Decimal point .....
Default ..... d
Feed paper ..... f
Monitor ..... m
Recall Memory ..... e
Report ..... r
Scroll Up/Down/Right/Left ..... arrow keys
Self Test ..... t
Setup ..... s
Status ..... a
Store memory ..... w
Value Down ..... page down

PowerPlot Control Accelerator Keys for 8800 PowerScopes Front Panel Operation

0-9	0-9 (numeric keypad)
Calibrate	t
Cancel printer	p
Clear	delete
Decimal point	.
Feed paper	f
Lock	c
Menus	r
Meters	e
Monitor	s
Preset Thresholds	m
Recall memory	l
Scroll Up/Down/Right/Left	arrow keys
Snapshot	d
Status	w
Store memory	a
Value Down	page down
Value Up	page up

PowerPlot Control Accelerator Keys for PowerProfilers Front Panel Operation

0-9	0-9 (numeric keypad)
Calibrate	t
Cancel printer	p
Clear	delete
Decimal point	.
Feed paper	f
Menus	u
Menus Print	i
Meters	m
Meters Print	,
Power Type Down	s
Power Type Up	w
Print Reports	]
Print Snapshot	h
Select	e
Reports Down	g
Report Interval Down	-
Report Interval on/off	[
Report Interval Up	+
Reports On/Off	y
Reports Up	t
Scroll Up/Down/Right/Left	arrow keys
Snapshot	]
Value Down	page down
Value Up	page up

2 PowerPlot View

About PowerPlot View

PowerPlot View enables you to review BMI PowerScope or PowerProfiler data files previously saved to diskette. With PowerPlot View you can review and print specific files, or cut and paste disturbances or files for use in word processing packages. For PowerProfiler files you can use the Export function to see what type of graphs exist in a file, and convert summary information into ASCII format and save it in a user-defined file. See the Export section of this manual for more information about this function.

Using PowerPlot View

Remember, if you don't want to use the mouse you can use your computer keyboard. Refer to the Accelerator keys section in this manual.

If you are using Windows 3.1, begin by typing "win" and pressing Return. If you are using Windows 3.0, type "win/s" and press Return. To open PowerPlot View, double-click on the PowerPlot View icon. All PowerPlot View capabilities, except Export for the PowerProfiler, are accessed from this header.

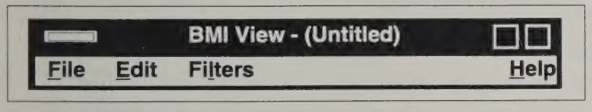

Figure 2: PowerPlot View Menu

Opening a File

To open a desired file, click on the File menu item (see Figure 4). Click on Open and a list of data files, directories, and BMI equipment will appear on screen.

You may view files generated on a different BMI instrument by clicking on the appropriate box. You may change directories by clicking on the appropriate directory. Select the file to be displayed by clicking on the desired filename in the Files entry block. The selected filename or directory will be displayed in the filename entry box.

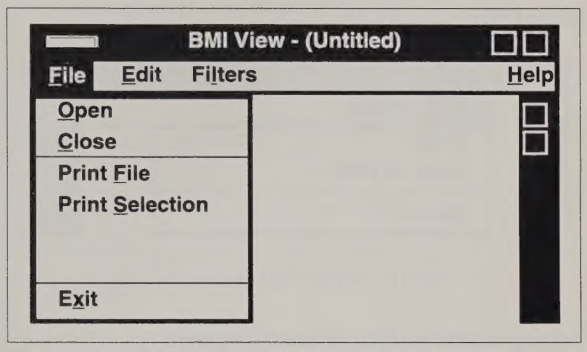

Figure 3: PowerPlot View File Submenu

Once you've located the file you want opened (it appears in the Filename box), click the OK box in this section. The file will appear in the PowerPlot View screen. Use the scroll bar to move through the file by clicking on the up/down arrows, clicking on a shaded area above/below the thumb position, or dragging the thumb position to another part of the bar.

You can open multiple copies of PowerPlot View via the Program Manager, provided sufficient memory is available. This allows you to move between open copies of PowerPlot View and look at files simultaneously.

Printing Files

You can print an entire file or portions of a file from the File menu.

Printing an entire file:

1. Select Print File from the File submenu.
2. Click on the appropriate directory and filename to select the file to be printed. When the desired file appears in the Filename block, click on the OK box or double-click on the file.

Printing Selections from a File:

1. With the desired file opened, highlight the portion you wish to print. (Note: you can only use a mouse to highlight, Accelerator Keys will not work). This can be any number of text and/or graphs.
2. Choose Print Selection from the File submenu.

PowerPlot View

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Editing Files

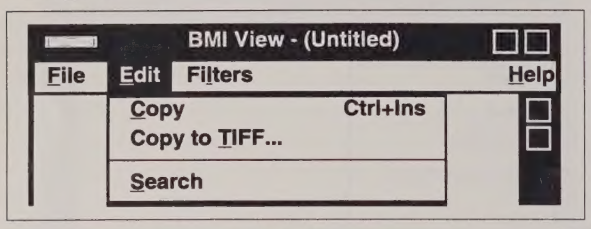

Figure 4: PowerPlot View Edit Submenu

Copying Graphs to Other Windows Programs

You can copy text or graphs from PowerPlot View for use in Windows Compatible word processing programs such as Microsoft Write and Word for Windows.

To copy text or graphs from PowerPlot View for use in Windows Compatible word processing programs:

1. Click and drag over the desired graph/text to highlight what you want to copy.
2. Select Copy from the Edit menu. The copied data now resides on the Windows clipboard.
3. If not opened already, open the desired compatible word processing program.
4. Position the program's cursor at the location where the copied graph or text is to be inserted.
5. Choose Paste from the program's Edit menu.

Consult the word processing program's manual for additional help on using PowerPlot data within the program. Note that copied text from PowerPlot View is now a graphic or picture, not text, in the word processing program.

Copying Graphs to Non-Windows Compatible Programs

Graphs can also be copied as a TIFF (Tagged Image File Format) file for use with other graphics programs not specifically Windows compatible. The copied data may be either compressed or not compressed, depending on the format required by the graphics program. Note that only graphs and the graph annotation are copied, not text.

To copy a graph as a TIFF file:

1. Highlight the desired graph. If more than one graph is highlighted, only the first will be copied.
2. Select Copy to TIFF from the Edit menu.
3. Choose either the Compressed or Not Compressed mode.
4. Select the directory and enter the file name for the output TIFF file.
5. Click OK or press Return.

Many word processors that import graphics do so by grabbing a copy of a graphics file at print time. This means that if a reference to a graphics file is made, that file must exist for it to appear in the document.

Searching for Specific Graphs

PowerPlot View allows you to search for specific text strings. Note: the Search function does not locate any words found within a graph—it searches for text only. To do this, open the Edit menu.

Select Search and the search dialog box will open. Enter the key word for information you want to find such as sag, waveshape fault, snapshot, etc. Click OK to start the search process. This search process will find the first occurrence of the criterion you specified. If you want to locate the next occurrence in the file simply select Search again and the same request will be displayed. This process can be repeated as many times as necessary.

Selecting Multiple Disturbances of a Single Type—Filters

Filters allows you to select particular types of graphs from a given file. Both 4800 PowerScopes and PowerProfiler graphs fall into specific category listings such as "Waveshape Fault" or "Power Factor Report". By choosing what categories you want to view, the Filters function will "filter" out and display only those graphs from the selected categories. Note: the Filters function does not support the 8800 PowerScope—only the 4800 PowerScope and the PowerProfiler can use Filters.

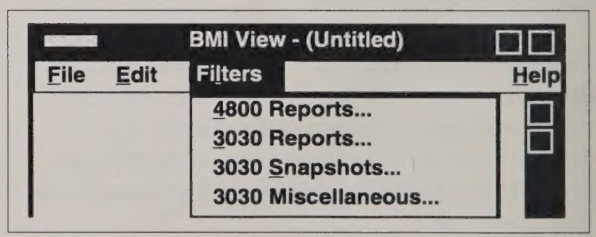

Figure 5: PowerPlot View Filters Submenu

2 PowerPlot View

Select to look at 4800 Reports, 3030 Reports, 3030 Snapshots, or 3030 Miscellaneous files. Various graph categories appear that enable you to set the selection, or filter criteria. Point and click the mouse to place an X in the boxes beside those parameters you want to view. Leave the box empty for the parameters in which you are not interested. Once you have selected all of the appropriate parameters, click on OK. Once you have configured your filter, you can open the desired file. Click on the File header and then select the Open submenu. Only the graphs meeting any of the specified criteria will be displayed. In some cases however, some 4800 PowerScope text information, such as Status, may be shown.

PowerPlot View

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3 PowerPlot Export

Export and the PowerProfiler

The 3030A PowerProfiler and 3030/3060 PowerProfilers containing firmware revision 4.0 or higher incorporate a feature called Summaries. Summaries provide text information of user-selected parameters measured over a one to 60 minute interval. This data may be converted into an ASCII format and imported into standard spreadsheets for further analysis. The Export facility performs this conversion process.

Export is designed to assist you in two ways, both of which require data to be sorted in a DOS compatible disk file. First, it allows you to quickly see what type of graphs exist in the file. Export takes the header information from each graph and saves it in a user-defined file. This file, once imported into a spreadsheet, contains the date, time, and header information so you can see what is on the original file. Second, Export takes PowerProfiler Summary information which has been stored in a file, converts it to ASCII format, and saves it in a user-defined file. This file can then be imported into a spreadsheet, graphed, used in calculations, or any manner the program allows.

```
==========================================
POWERPROFILER SITE          Nov 21  1994    (Thu)

BMI  SUMMARY                            10:35:01  AM

   FROM:   10:34  AM  Nov 21  1994  (Mon)
   To:     10:35  AM  Nov 21  1994  (Mon)

Demand:
   Phase              Average              Unit
   A—N                1.152                kW
   A—N                0.72                 PF

==========================================
```

Figure 6: Export Summary Data. Export converts only average KW and PF.

Storing Data On a Disk

Using the Storage Menu data can be saved to the PowerProfiler's optional 720 kByte double-sided, double-density disk drive. Since this is a DOS compatible drive, the disk can be inserted into any suitable PC floppy drive and accessed through PowerPlot.

Starting Export

Even though Export is a DOS program, it is accessible through PowerPlot running under Microsoft Windows. Export can also run directly from DOS.

Using Export While Running Under Windows

Once PowerPlot has been installed on your system, the PowerPlot window is accessible from Windows Program Manger. Open Export by double-clicking the Export icon.

Using Export While Running Under DOS

At your system prompt, type in the following command:

[Drive]:\[Path]\Export <return>

where drive is the drive the Export program is on (typically C:), and Path is the directory where Export is located (typically \BMI40).

DOS Options

All *.PWR files in a given directory and path can be appended and exported into one file by using the following options in the Command Line:

\(Path)\Export [-a] [-8] *.PWR

Where:

- \(Path) = Path where the desired PowerProfiler files reside. Be sure that Export can run from this path.
- \Export = Command to execute Export.
- [-a] = Optional command to take Header data from all the .PWR files in the listed path and append them into one converted .123 file. The .123 filename will be set to the first .PWR file's name.
- [-a] [-8] = Using both optional commands will append all Summary data from all the files in the requested path into one .123 file. The .123 filename will be set to the first .PWR file's name.
- *.PWR = Request for action on all .PWR files in the requested path.

PowerPlot Export

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Using Export

Export is operated by using function keys on your keyboard. If, at any time you make a mistake, simply press Return and start over. The program only runs when either F5 or F6 is pressed. You can press F8 at any time to quit.

Selecting the Source File

When Export is opened, all PowerProfiler files (*.PWR) in the default path are automatically listed on screen.

1. If the default path is what you want, go to Step 3. If not, use function key F3 to select the source file path.
2. Type in the appropriate path and press Return.
3. Press F1, and the scroll arrows will allow you to jump between file choices for your Source File.
4. Once your file is highlighted, press Return and that file name will be listed as the source.

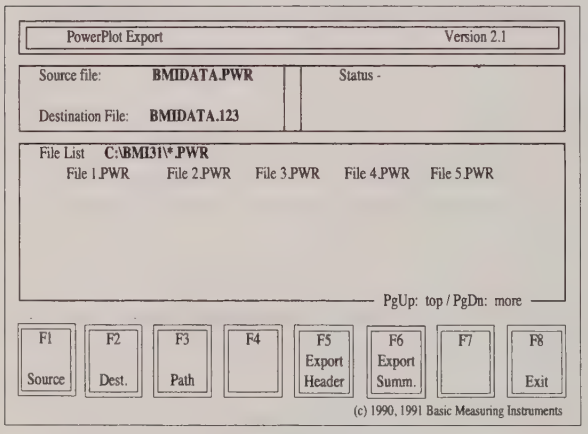

Figure 7: PowerPlot Export Display

Selecting the Destination File

The program automatically selects a destination file name (*.123) on the same path as your Source File. You can change the file name, but not the path. If you want to change the file name:

1. Press F2.
2. Type in the new file name. Remember, this file will be on the same path as the Source File.
3. Press Return.

Note: The default destination extension is *.123. The file is in ASCII format, not in Lotus 1-2-3 format.

Generating a Header File

Export can generate a Header File to help simplify your search. A header file is an ASCII file which contains each graph's header information only. When this is viewed in DOS or imported into a spreadsheet, you can quickly see exactly what is in the original power file and determine if you want to examine the graphs in more detail with PowerPlot.

1. Select the desired Source and Destination files.
2. Press F5. The upper right box will provide the status of the program.
3. When the export is completed, you can repeat the process for additional files, or press F8 to exit.

Converting Summary Data

Most of the time you will use Export to convert Summary data from your PowerProfiler into ASCII format suitable for spreadsheets. Recall that the summaries must be stored either on a floppy disk or in a file on the PC.

To convert the Summary data:

1. Select the desired Source and Destination file names.
2. Press F6. The upper right box will provide the status of the program.
3. When the export is completed, you can repeat the process for additional files, or press F8 to exit.

Importing into Spreadsheets

Since both Header Files and exported Summaries are in ASCII format, they can easily be imported into standard spreadsheet programs such as Microsoft Excel and Lotus 1-2-3. When importing this data, the spreadsheet needs to know two items—first that the delimiters are commas; and second, that the file origin is DOS.

Once these steps are completed, the exported file can be imported. Table 1 shows a spreadsheet with Summary data.

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A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
File name	Site name	Dec	11	1991	5	12	41	PM	—	Power Consumption	SNAP.HEAD	0	—	0	—
File name	Site name	Dec	11	1991	5	12	43	PM	—	Consum. Phase A	SNAPSHOT	0	—	0	—
File name	Site name	Dec	11	1991	5	13	2	PM	—	Power Factor	SNAP.HEAD.	0	—	0	—
File name	Site name	Dec	11	1991	5	13	10	PM	—	Harmonics	SNAP.HEAD.	0	—	0	—
File name	Site name	Dec	11	1991	5	13	19	PM	—	Harm. Ph. A Amp.	SNAPSHOT	0	—	0	—
File name	Site name	Dec	11	1991	5	14	10	PM	—	Voltage & Current	SNAP.HEAD	0	—	0	—
File name	Site name	Dec	11	1991	5	14	16	PM	—	Voltage Phasor	SNAPSHOT	0	—	0	—
File name	Site name	Dec	11	1991	0	0	0	0	—	Power Consumption	REP.HEAD.	0	—	0	—
File name	Site name	Dec	11	1991	5	15	35	PM	—	Inst. Power	REPORT	0	—	0	—
File name	Site name	Dec	11	1991	0	0	0	0	—	Power Factor	REP.HEAD.	0	—	0	—
File name	Site name	Dec	11	1991	5	16	29	PM	—	VAR	REPORT	0	—	0	—
File name	Site name	Dec	11	1991	0	0	0	0	—	Harmonics	REP.HEAD.	0	—	0	—
File name	Site name	Dec	11	1991	5	17	35	PM	—	Harmonics 3	REPORT	0	—	0	—
File name	Site name	Dec	11	1991	0	0	0	0	—	Voltage & Current	REP.HEAD.	0	—	0	—
File name	Site name	Dec	11	1991	5	18	14	PM	—	Voltage	REPORT	0	—	0	—
File name	**Site name**	**Date**			**Hr.**	**Min.**	**Sec**		**Spacer**	**Header**	**Type**			**Spacers**	

Table 1: Typical Header File Spreadsheet

Column	Description	Comments
A	File name	Name of the .PWR file.
B	Site name	User defined site name used while monitoring.
C,D,E	Date	Date of data acquisition.
F,G,H,I	Time	Time of data acquisition.
J	Spacer	Holder for future use.
K	Header	Report, Snapshot, Meters, Menus, Calibration.
L	Type	Is data a graph or header?
M,N,O,P	Spacers	For future use.

Table 2: Spreadsheet Header File Descriptions

Column	Description	Comments
A	kiloWatts	Average power during Summary interval.
B	True PF	Average true PF during Summary interval..
C	Day	Day of week when this data was acquired.
D	Date	Date of data acquisition. Must be converted to a date format.
E	Time	End time of interval.

Table 3: Spreadsheet Summary Descriptions

Column	A	B	C	D	E
	8.56E+00	8.10E-01	Thu	10/17/91	17:14:00
	1.08E+01	8.5E-01	Thu	10/17/91	17:19:00
	1.09E+01	8.80E-01	Thu	10/17/91	17:24:00
	1.08E+;01	8.80E-01	Thu	10/17/91	17:29:00
	1.11E+01	8.90E-01	Thu	10/17/91	17:34:00
	1.09E+01	8.90E-01	Thu	10/17/91	17:34:00
	1.12E+01	8.80E-01	Thu	10/17/91	17:44:00
	1.11E+01	8.90E-01	Thu	10/17/91	17:49:00
	7.66E+00	8.40E-01	Thu	10/17/91	17:54:00
	7.71E+00	8.20E-01	Thu	10/17/91	17:59:00
	kiloWatts	True PF	Day	Date	Time

Table 4: Typical Summary Data Spreadsheet

PowerPlot Export

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4 PowerPlot Control

About PowerPlot Control

PowerPlot Control software lets you use your PC to control PowerScopes and PowerProfilers remotely. This is done through a modem, or using the RS-232 communication port.

Connecting Cables For a Modem or RS-232

When using a unit with an internal modem, an RJ-11 cable plugs directly into the Line connector on the rear of the unit. If you are using an external modem, the modem connects to the unit via the RS-232 connector and the RJ-11 cable connects directly to the modem.

For communication via RS-232 be sure to use the proper cable. For DB-25 the cable must provide connections between pins two, three, and seven. For DB-9, connection must be made between pins two, three, and five. For both DB-25 and DB-9, the connections between pins two and three must be swapped at one end of the cable. This enables the transmit line of each device to be connected to the receive line of the other device. Connect the cable between the RS-232 port on the BMI unit and the PC's communication port. This connection must be made prior to calling the unit from your computer.

Setting Up a PowerScope or PowerProfiler as a Slave Unit

Before establishing control from your PC, each PowerScope or PowerProfiler in your network must be programmed as a slave unit with the proper communications port selected. Do this when you place the unit in the field. Other menu items can be set or changed later through the PowerPlot Control Program.

To set a PowerScope as a slave unit:

1. Access the Key Operator menu.
2. Press the Value Down button until you reach the Communication menu.
3. Press the Scroll Down arrow to enter the menu.
4. Answer the questions in the menu and select the options for a slave unit. You will need to enter the phone number of your PC (master) into the directory of your PowerScope if you want the unit to be able to call your PC.
5. Turn the PowerScope printer on or off as desired. If you have an optional internal disk drive or an A-600 Parallel Processor you can save your data to a diskette so you probably want to turn the printer off. Be sure to place a formatted, double-sided, double density diskette into the disk drive and set the PowerScope disk drive to the Record mode.
6. To make sure the PowerScope printer is configured correctly refer to the section in this user's guide entitled, "Disk Storage, Communications, and the Printer".

Warning: Be sure to use only double-sided, double density diskettes.

To set a PowerProfiler slave unit:

1. Access the Communication menu by pressing the Menus button once, then press the Value Down button until you reach the Communication menu.
2. Answer the questions in the menu and select the option for a slave unit. You will need to enter the phone number of your PC (master) into the directory of your PowerProfiler if you want the PowerProfiler to be able to call your PC.
3. Turn the PowerProfiler printer on or off as desired. If you have an optional internal disk drive you can save your data to a diskette so you probably want to turn the printer off. Be sure to place a formatted, double-sided, double density diskette into the disk drive and set the PowerProfiler disk drive to the Record mode.
4. To make sure the PowerProfiler printer is configured correctly, refer to the section in this user's guide entitled, "Disk Storage, Communications, and the Printer."

Refer to the PowerScope or PowerProfiler User's Guide for menu layouts and setup information.

Disk Storage, Communications, and the Printer

All PowerScopes and PowerProfilers have the ability to store data to floppy disks. For the 4800 PowerScope this requires an A-600 Parallel Processor. The 8800 PowerScope and the 3030A PowerProfiler can be optionally configured with an internal disk drive. The disk drive is standard with the 2400 PowerScope and the 3060 PowerProfiler.

When setting up you PowerScope or PowerProfiler for both data storage and remote communications, there are two menu options which will affect the operation of the internal printer. One of

these options is in the Storage Menu and the other is in the Communication Menu. Each menu asks whether the internal printer should be turned on or off. Table 5 (below) shows what will happen when answering these questions. "Slave" refers to the Communication Menu and "Storage" refers to the Storage Menu.

Setting Up a PC for RS-232 Communication

To prepare your PC to communicate via RS-232 with a PowerScope or PowerProfiler:

1. If you are using Windows 3.1, start by typing "win" and pressing Return. If you are using Windows 3.0, type "win/s" and press Return.
2. Start the PowerPlot Control program by double-clicking on the PowerPlot Control icon.

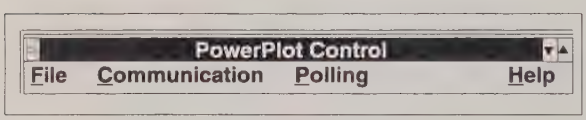

Figure 8: PowerPlot Control Menu

3. After PowerPlot Control has successfully loaded, pull the Communication menu down and select RS-232. Your selection will be indicated by a check mark.

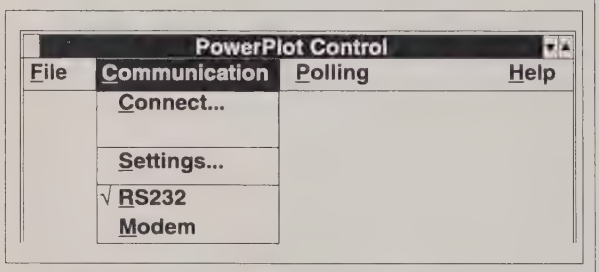

Figure 9: PowerPlot Control Communications Submenu

4. Verify that the RS-232 cables are connected properly.
5. Select Settings to change the RS-232 baud rate, PC communication ports, default connection. Use the mouse to select the appropriate communication settings.

	Saved on Internal Disk	Printed on Internal Printer	Sent to PC
Slave on, Storage on	yes	yes	yes
Slave off, Storage on	yes	no	yes
Slave on, Storage off	yes	no	no
Slave off, Storage off*	yes	no	no

*not recommended

Table 5: Communication Menu, Storage Menu Printer Settings

Communicating With a Slave Unit

To connect your PC with the slave PowerScope or PowerProfiler:

1. Access the PowerPlot Control program.
2. Pull down the Communications menu and select Connect.
3. The Data File Name box will appear. Choose and enter a name for the file in which data from your PowerScope or PowerProfiler will be stored. The default name for 2460 and 4800 PowerScopes is BMIDATA.DIS, for 8800 PowerScopes it is BMIDATA.PDF, and for 3030/3060/3030A PowerProfilers it is BMIDATA.PWR. You may want to enter a new name so subsequent files will not write over this file.

Note: All 4800 and 24X0 PowerScope display data files must end with the extension ".DIS", all 8800 PowerScope files use the extension ".PDF", the PowerProfiler must use the extension ".PWR".

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4. Click OK to select the file. When the PC connects to the PowerScope or PowerProfiler, the slave will display the message "CALL RECEIVED" and a front panel simulation will be displayed on your PC screen. The front panel of the slave unit locks to prevent tampering during the PowerPlot session.
5. Position the cursor on a key and click the mouse to "push" the buttons just as you would if you were operating the unit from the front panel.
6. Set up the unit from your screen. If you connected to a PowerScope, don't forget to push the MONITOR button to begin your monitoring session.

Setting Up the Phone Directory

If you are communicating via modem you must set up your telephone directory:

1. Access the PowerPlot Control program as previously outlined.
2. Pull down the File menu and select Phone Directory.

4 PowerPlot Control

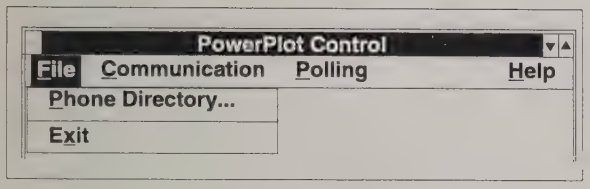

Figure 10: PowerPlot Control File Submenu

3. Position the cursor in the name box. Type in a name for your slave unit and its telephone number. Use a comma for a two-second pause. Use Add to add the entry, Change to modify an entry, and Delete to remove an entry. You can enter as many as twenty names in the directory.
4. To select a phone directory listing, click on the name. The selected listing will appear in the header box.
5. To select the current listing and exit PowerPlot Control, click on OK. If changes have been made, you must click on "Add" or "Change" to save these changes.

Calling a Slave Unit Via Modem

To have your PC call a slave unit:

1. Access the PowerPlot Control program.
2. Pull down the communications menu and select Connect.
3. The Phone Directory dialog box appears. Click on the name of the unit you want to call. The name will appear in the header box. Click OK to select the name and exit.
4. The Data File Name box will appear. Choose and enter a name for the file in which data from your PowerScope or PowerProfiler will be sorted. The default name for 2460 and 4800 PowerScopes is BMIDATA.DIS, for 8800 PowerScopes it is BMIDATA.PDF, and for 3030/3060/3030A PowerProfilers it is BMIDATA.PWR. You may want to enter a new name so subsequent files will not write over this file.

Note: All 4800 and 24X0 PowerScope display data files must end with the extension ".DIS", all 8800 PowerScope files use the extension ".PDF", the PowerProfiler must use the extension ".PWR".

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5. Click OK to select the file. The PC will now place the call to the selected unit. When your PowerScope or PowerProfiler receives the call the slave displays the message "CALL RECEIVED" and a front panel simulation will be displayed on your PC screen. The front panel of the slave unit locks to prevent unwanted disruptions of your PowerPlot connection.
6. Position the cursor on a key and click your mouse to "push" the buttons just as you would if you were operating the unit from the front panel.
7. Set up the unit from your screen. If you connected to a PowerScope, don't forget to push the MONITOR button to begin your monitoring session. The PowerScope will automatically disconnect based on the Hold-Line-For setting in the instrument.

Receiving Calls from a Slave Unit

You can set up your PowerScope(s) or PowerProfiler(s) to automatically initiate a call to your PC (master) whenever it needs to print. The slave connects with the PowerPlot Control program and downloads the information into the selected disturbance or power file. If your computer is going to receive calls from more than one unit, you must assign different names to them in the telephone directory as well as unique filenames.

When communicating via modem, you can break the connection but must leave the PC on with the PowerPlot Control program running if the slave unit is initiating calls.

To set up your slave unit(s) to call your PC:

1. Your PC modem must be set for auto-answer in order to receive incoming calls from slave units.
2. Enter the name and number of your PC into the phone directory of each slave unit.
3. In each slave's communication menu, select the appropriate master telephone number.
4. Ensure each unit is properly monitoring, and choose Disconnect from the Communication menu.
5. Leave the PowerPlot Control program running on your PC.

Polling

PowerPlot Control enables you to perform PowerScope harmonics analysis and PowerProfiler Snapshots automatically at user-defined intervals with the Polling feature. Note: in order to perform harmonics analysis your PowerScope must be equipped with the harmonics analysis option package. (A similar function for the PowerProfiler is performed by different method as described in the section of this user's guide entitled, "Harmonics Analysis and the PowerProfiler".)

PowerPlot Control

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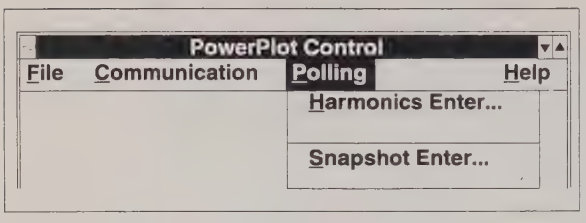

Figure 10: PowerPlot Control Polling

Harmonics Analysis and Snapshot Printing with the PowerScope

Harmonics spectrum analysis can be performed with a 2460 or 8800 PowerScope and a 4800 or 2400 PowerScope (equipped with an A-600). When communicating remotely with a PowerScope, PowerPlot provides two methods for obtaining harmonics information: 1) one-time harmonics report and 2) harmonics report at regular intervals.

One-time Harmonics Report

Since PowerPlot Control provides a front panel representation of the PowerScope, a harmonics report can be generated remotely in the same way one is requested locally. While in PowerPlot Control, use the mouse to select the Status button immediately followed by the Scroll Up arrow.

Harmonics Reports at Regular Intervals

PowerPlot Control allows you to obtain a harmonics report at user-defined intervals ranging from 15 minutes to 24 hours. To do this, PowerPlot Control must remain running. It will fully control the communications link and the harmonics report request.

To establish a regular harmonics interval:

1. Pull down the Polling menu and choose Harmonics Enter.
2. Select the desired sampling interval (0.25 to 24 hours). The PowerScope will automatically return to monitor after obtaining a harmonics report.
3. If you are using a modem, the telephone directory will automatically be displayed so you can choose the slave unit's telephone number.
4. After selecting the slave's phone number, or if you are connecting via RS-232, choose a data file name (if desired) for data storage in your PC. Click on OK.
5. PowerPlot Control will now open the communication link, perform the harmonics report request, then disconnect until the displayed timer indicates the interval is over and another request is to be made.

Harmonics Analysis and the PowerProfiler

The PowerProfiler provides trend analysis reports on voltage and current THD, and on up to four individual user-selected harmonics (with the Harmonics Option Package). Harmonics spectra, however, must be manually requested. PowerPlot Control allows you to obtain reports and snapshots remotely, and also it allows you to obtain a snapshot on a regular interval similar to the PowerScope.

One-time Harmonics Snapshot

To select a one-time harmonics snapshot with a PowerProfiler:

1. While in PowerPlot Control and linked to a PowerProfiler, use the mouse to press the UP/DOWN arrows in the REPORTS section until the box to the left of HARMONICS is blinking.
2. Press PRINT SNAPSHOT.

Harmonics Snapshots at Regular Intervals

1. Either prior to leaving the unit or upon a remote link-up turn on HARMONICS in the REPORTS section of the front panel.
2. On your PC, pull down the Snapshots submenu in PowerPlot Control and choose Enter.
3. Select the sampling interval between 0.25 and 24 hours and click on OK.
4. If you are using a modem, choose the slave's telephone number from the directory which automatically opens up. Click on OK.
5. After selecting the slave's telephone number, or if you are connecting via RS-232, choose a data file name (if desired) for data storage in your PC. Click on OK.
6. PowerPlot Control will now open the communication link, perform the harmonics snapshot request, then disconnect until the displayed timer indicates the interval is over and another request is to be made.

PowerProfiler Snapshot Reports at Regular Intervals

You can also obtain voltage and current snapshots from a PowerProfiler at desired intervals.

1. Pull down the Polling menu and choose Snapshot Enter.
2. Select the desired sampling interval (0.25 to 24 hours).
3. If you are using a modem, the telephone directory will automatically be displayed so you can choose the slave unit's telephone number.

4. After selecting the slave's phone number, or if you are connecting via RS-232, choose a data file name (if desired) for data storage in your PC. Click on OK.
5. PowerPlot Control will now open the communication link, perform the Snapshot report request, then disconnect until the displayed timer indicates the interval is over and another request is to be made.

Snapshots and the PowerProfiler

Any snapshot, similar to the PowerProfiler harmonics snapshot, may be requested. For different snapshots at different intervals, simply turn on those reports prior to entering the Snapshot function from PowerPlot Control.

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